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(Rasprostranennost' toksoplazmoza v Tyumenskoi oblasti)

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## THE INCIDENCE OF TOXOPLASMOSIS IN THE TYUMEN REGION

(Rasprostranennost' toksoplazmoza v Tyumenskoj oblasti)

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It has been established recently that toxoplasmosis is a fairly common disease in the USSR. Congenital toxoplasmosis is of special importance. Sick or clinically healthy mothers who are symptomless carriers of toxoplasmosis may give birth to children with severe defects in the CNS and internal organs, with deformities and vision damage (chorioretinitis, optic nerve atrophy, etc.). The medical profession must therefore pay close attention to this infection, especially to its zoogeography, epidemiology and prophylaxis.

Toxoplasmosis is widespread in all continents and in various climates. There are indications, however, that it is more frequently observed in hot countries. Feldman (1953) found toxoplasmosis in 68% of the population of Tahiti, in 20 to 30% of the populations of Haiti, Pittsburg, New Orleans and St. Louis, in 11% of the population of Iceland, and none in the population of Alaska.\*

The incidence of toxoplasmosis in the apparently healthy population in the southern and central parts of the USSR was studied by the Russian scientists, Gracheva et al. (1960, 1961), the range being 17 - 38%. There are no data in the Soviet literature on the incidence of the disease in the Far North.

The Tyumen Region lies between 55° and 73° N, and includes different geographical zones: tundra (Yamal-Nenets National District), taiga (Khanty-Mansi National District), and forest-steppe (the southern part of the Tyumen Region). This made it possible to study the incidence of toxoplasmosis within wide geographical limits.

It is well known that reindeer breeding, fur farming, hunting and fishing are common occupations in the Far North and in the taiga; there is a large number of dogs in these settlements (for transportation and hunting, as well as strays).

For our investigation we selected three stock-breeding sovkhoses in different regions. The investigation was carried out by skin test and complement fixation reactions.

The Lugovskii sovkhos has a large breeding station (cattle, sheep, goats and pigs), and is located in the forest-steppe zone. The investigation included the service personnel of the sovkhos, as well as the inhabitants of Kulakovo village. A total of 214 persons was examined.

\* According to serological tests.



The skin test reaction showed positive results in 40 persons (18.6%). The incidence was higher among the Russian than among the non-Russian population (35 out of 40) and higher among women than men (37 out of 40). The distribution of the positive skin test reaction results according to occupation was as follows: 8 pig tenders out of 14, 4 cowhands out of 42, and 28 out of 158 others (farmers, mechanics, housekeepers) who all, to a varying extent, had contact with animals. The majority (28 out of 40) of the 21 - 50 age group showed positive results. Among the 8 women examined who had abnormal pregnancies, 5 showed a positive skin test reaction. Complement fixation reaction was negative in all persons examined. The serum of 174 cows from the private sector was also tested for complement fixation reaction, and the results were negative.

The Kondinskii sovkhos has a large cattle-breeding and fur-farming concern. It is located in the taiga zone. A total of 279 persons was examined. A positive skin test reaction was obtained in 36 persons (12.9%). As in the Lugovskii sovkhos the positive test was more frequent (24 out of 36) among the Russian population, and considerably less among the Mansi population (7 out of 36). The women, too, showed a higher incidence of positive tests (30 out of 36). A positive test was obtained in 6 out of 12 pig tenders, in 5 out of 19 herdsmen, and in 11 out of 81 milkmaids and calf-herders. A positive skin test reaction was obtained more frequently (30 out of 36) in the 21 - 51 age group. A positive skin test reaction was noted in 6 out of 19 pathological obstetric cases.

The complement fixation reaction was negative in all persons examined, as well as in 485 cows, pigs and horses. Inquiries revealed that the disease was observed among cats in 1961, when it was accompanied by digestive and nervous disorders and terminated in death. The serum of the cats was not investigated.

The Polyarnyi sovkhos is a reindeer- and fur-breeding farm. It is located within the Arctic circle, in the Yamal-Nenets National District. A total of 75 persons was examined, of whom 11 (14.6%) gave positive results with both the skin test and complement fixation reactions.

Positive results were more frequently encountered among the Sel'kup population (6 out of 11), and were more widespread among women than among men (8 out of 11). The majority of persons between the ages of 21 and 50 (10 out of 11) showed a positive reaction. As far as occupation is concerned, almost all the persons with a positive reaction (10 out of 11) in this sovkhos had no particular trade; in fact, each of them had various kinds of occupations.

Since the positive reaction for toxoplasmosis was observed in the sovkhos only among the Sel'kups of the local population, we examined the indigenous population (the Nenets people) as a control group. A total of 113 persons from the Tabei-Sale settlement (Tazovskii area, adjacent to the Krasnosel'kupskii area, Yamal-Nenets National District) was examined. Not one positive test was obtained.

On analysis of the data obtained from investigation of the workers of the Lugovskii, Kondinskii, and Polyarnyi sovkhoses, we noted a positive skin test reaction for toxoplasmosis in 18.6, 12.9 and 14.6% respectively. A positive complement fixation reaction was found only in the Polyarnyi sovkhos. This indicates that some of the workers of the two former sovkhoses (mainly the women) had had toxoplasmosis in the past, whereas





some of the workers (14.6%) of the Polyarnyi sovkhov apparently had had the disease quite recently (1 - 2 years previously), or even at the time of investigation (in a mild form), as indicated by the positive complement fixation reaction.

It is known that the immunological feature peculiar to toxoplasmosis is the sensitization of the patient's organism to the toxoplasmic antigen for almost his entire lifetime, although the antibodies remain in the blood for only 2 - 3 years (Gracheva et al., 1960 - 1961; Frenkel' and Sebin, 1949; Kozar, 1953). This justifies our conclusion that toxoplasmosis was present in the Polyarnyi sovkhov, as the affected local population did not leave the sovkhov. Those with a positive complement fixation reaction were Sel'kups, most of them women. It was epidemiologically established that they had no definite trade, alternating between reindeer and fur breeding, etc. As already mentioned, a Nenets group from a settlement in the Tazovskii area, whose main occupation was fishing, was investigated for comparison. Not a single positive skin test or complement fixation reaction was obtained.

On the basis of inquiries among the local population examined it was established that raw fish was frequently used in the diet of the Nenets population, whereas the Sel'kups use more raw reindeer meat, and as a special delicacy, the brain, liver, and fresh blood of this animal. We therefore investigated the blood of 275 northern reindeer. The complement fixation reaction was positive in 20%. This indicates that in the Far North reindeer play a definite role in the dissemination of toxoplasmosis.

Our data are preliminary. To establish the natural source of the invasion, further epidemiological studies are required (fur animals, dogs, lemmings, etc.).

## Conclusions

1. The incidence of a positive skin test reaction for toxoplasmosis antigen was approximately the same among 761 inhabitants of the southern and northern parts of the Tyumen Region (Lugovskii sovkhov — 18.6%, Kondinskii sovkhov — 12.9%, and Polyarnyi sovkhov — 14.6%).

2. A positive skin test reaction was found more frequently among women, mainly between the ages of 21 and 50 years.

3. The positive skin test reaction as well as a positive complement fixation reaction found among the workers of the Polyarnyi sovkhov indicated that toxoplasmosis is endemic there.

4. The test was positive in 11 out of 27 women with abnormal pregnancies or deliveries (congenital deformities, abortions, etc.).

5. Complement fixation reaction was negative in all of the blood serum samples obtained from 659 domestic animals (cows, pigs, horses).

6. Twenty percent of reindeer blood sera showed a positive complement fixation reaction to toxoplasmosis antigen. This indicates that reindeer play a definite role in the propagation of toxoplasmosis among humans in the Far North.

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